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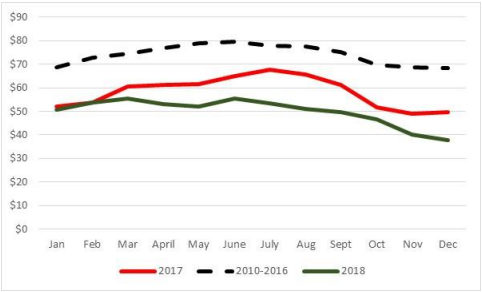
Trying to Make Sense of the Current Cull Cow Market

Despite the fact that calf prices ended 2018 roughly $8 per cwt lower than 2017, taking another bite out cow-calf returns, cull cow markets have been getting most of the attention as of late. Cull cow markets typically have one of our more predictable seasonal patterns. Prices tend to be lowest late in the year and move up to make their highs in late spring or early summer. The dotted black line in Figure 1 shows this pattern for 85% boning cows from 2010 to 2016, but 2017 and 2018 have similar trends. Let's start by discussing why this is the typical seasonal pattern for cull cow prices.

Figure 1. Cull Cow Prices – Boning 80-85% KY Auctions ($ per cwt)



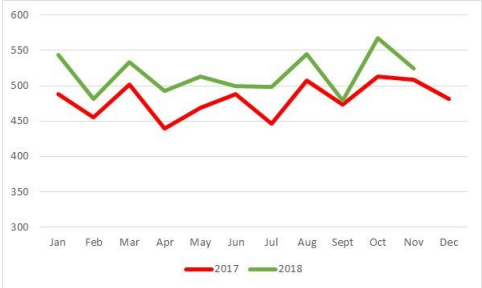
Source: USDA-AMS, Livestock Marketing Information Center, Author Calculations

First, we tend to sell more cull cows late in the year. The majority of our cows calve in the spring and cow-calf operators like to sell their cull cows when they sell their weaned calves. One could also argue that cows are likely in poor condition at that time, which may also affect the prices they receive. At the same time, there have always been individuals who purchase cull cows with the intention of keeping them for a short time and reselling them or trying to get another calf out of them. The cost of doing this is higher late in the year because we are several months away from pasture growth. This higher cost structure is reflected in lower values for those cows.

Admittedly, there has to be more than seasonality at play this year, as the drop has seemed to be larger than usual. Plus, while Figure 1 shows a state average price for 85% boning cows in the upper $130's, I am hearing a lot of reports of much lower prices on given days at given locations. As I work to think through what is going on, I would point to three factors that are a bit unique to the current market.

First, we are seeing larger than normal cow slaughter. Figure 2 depicts federally inspected cow slaughter, by month, for 2017 and 2018. Cow slaughter in 2018 has exceeded 2017 levels in all 11 months for which data existed at the time of this writing. For the first 11 months, cow slaughter was 7.2% higher in 2018 than 2017. While beef cow slaughter is actually up by larger percentage than dairy cow slaughter for the year, dairy slaughter was up by roughly 10% in both October and November. This basic supply comparison explains part of what is making the current situation unique.

Figure 2. Monthly Federally Inspected Cow Slaughter (1,000 head)



Source: USDA-NASS and Livestock Marketing Information Center

Secondly, I think we have to acknowledge that weather is partly to blame here. Cold and wet conditions are never supportive to cattle prices and the last several months have been just that. In addition to affecting the demand for cull cows, weather like this also has an

impact on their quality. Cattle are stressed, thin, and simply are not as marketable.

Third, I want to mention something that I brought up in my December article in Off-the-Hoof. There is no denying that we are seeing increased production levels across beef, pork, and poultry. My colleague in Oklahoma, Dr. Darrell Peel made a good point in Oklahoma State's Cow/Calf Corner newsletter back in the fall. He suggested that increased pork and poultry supplies may be having a disproportionately large impact on ground beef. I think this makes sense, given that the price levels for most pork and poultry products are more comparable to ground beef than middle meats. Since cull cows tend to be a largely ground beef market, it makes sense that cull cow markets would be more impacted than steers and heifers.

Regardless, I still view this cull cow market as a short-term phenomenon. Granted, we will have to contend with growing meat supplies and the bulk of winter still lies ahead. But, while the increased supply of cull cows could be a signal of the cycle turning, this level of year-over-year increase won't be sustained. Like is often the case in cattle markets, spring weather is probably the best cure for this problem.

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Potential 2019-2020 Corn and Soybean Balance Sheets and Price Potential

At this point in January in normal years, the market typically shifts its focus to South America's production and the potential 2019 planted area. This year isn't a normal year as the delayed USDA reports have the market in an information limbo. However, it is worthwhile to consider how potential changes in the planted area might affect ending stocks and the 2019-20 U.S. marketing-year average (MYA) price.

The preliminary USDA *Agricultural Baseline* projections released in November suggested that corn area would increase by 2.9 million acres from 2018. The agricultural media is publishing surveys of farmers that indicate they do not plan to change their rotation from 2018 even with lower soybean futures than last year. The farmer surveys suggest corn area may not increase as much as projected by USDA in November. Table 1 provides a sensitivity analysis of corn area increasing by 1 and 2.9 million acres, respectively, on ending stocks and the corn MYA price.

The sensitivity analysis performed in Table 1 uses the trend-yield of 178 bushels/acre with yields that are 2 bushels below trend and 2 bushels above trend. The beginning stocks for 2019-20 are the ending stocks from the December 2018 *WASDE* for the 2018-19 marketing-year. Total use is estimated to remain constant from the 2018-19 marketing-year, which is a conservative assumption.

If corn area increases by 1 million acres and obtains trend-yields, corn stocks could continue to decline to about 1.4 billion bushels or a 9.3% stocks-to-use ratio (Table 1). Even with above trend yields, ending stocks could still decline from the 2018-19 marketing-year. A conservative projection of the U.S. marketing-year average price is that corn prices could increase by $0.10 to $0.30 per bushel from the current projected U.S. MYA price for the 2018-19 marketing-year.

Because corn has strong demand, a 2.9 million increase in planted area could still result in lower stocks if yields are at trend or below trend. The takeaway message from Table 1 is that the market could handle an increase in area with trend yields. The other message is that there is little relative cushion in stocks to absorb a weather event that reduces production (Table 1). A yield of 172 bushels/acre with a 1 million acre increase in plated area could result in corn stocks at about a 6% stocks-to-use ratio, which would approach minimum pipeline levels.

Table 1. Potential 2019-20 U.S. Corn Balance Sheet.

	Acreage Increased by 1.0 Million			Acreage Increased by 2.9 Million		
Planted Area	90.1			92.0		
Harvested Area	82.0			83.7		
Yield	176.0	178.0	180.0	176.0	178.0	180.0
Beginning Stocks + Imports	1,831			1,831		
Production	14,434	14,598	14,762	14,739	14,906	15,074
Total Supply	16,265	16,429	16,593	16,570	16,737	16,905
Total Use	15,030			15,030		
Ending Stocks	1,235	1,399	1,563	1,540	1,707	1,875
Stocks-to-Use	8.2%	9.3%	10.4%	10.2%	11.4%	12.5%
Days of Stocks	30	34	38	37	41	46
MYA Price	$3.92	$3.81	$3.71	$3.73	$3.64	$3.56

Table 2. Potential 2019-20 U.S. Soybean Balance Sheet.

	Acreage Reduced by 2 Million			Acreage Reduced by 4 Million		
Planted Area	87.1			85.1		
Harvested Area	86.3			84.3		
Yield	47.0	49.0	51.0	47.0	49.0	51.0
Beginning Stocks + Imports	980			980		
Production	4,057	4,234	4,407	3,964	4,132	4,301
Total Supply	5,037	5,214	5,387	4,944	5,112	5,281
Total Use	4,100			4,100		
Ending Stocks	937	1,114	1,287	844	1,012	1,181
Stocks-to-Use	22.9%	27.2%	31.4%	20.6%	24.7%	28.8%
Days of Stocks	83	99	115	75	90	105
MYA Price	$8.63	$8.34	$8.09	$8.81	$8.50	$8.24

The preliminary projections released in early November 2018 projected 2019 soybean planted area to fall by over 6 million acres from 2018. Since the release of those projections, the November 2019 soybean contract has traded in an upward trend market and is about $0.80/bushel higher from the lows made in September 2018. The sensitivity analysis conducted in Table 2 considers the soybean area reduced by 2 and 4 million acres from 2018, respectively.

If soybean area is reduced by 4 million acres and a trend-yield is harvested, soybean stocks could increase to over 1 billion bushels. The U.S. MYA price would potentially be $0.10/bushel below the current projected price for the 2018-19 marketing-year (Table 2). A risk for the soybean market is planted area declining by only 2 million acres from 2018. Given the potential for above-trend yields coupled with sluggish use, soybean stocks could continue to grow to over 1.1 billion bushels. Under that scenario, the U.S. MYA price could decline to $8.30/bushel. Given the potential for a bearish story for 2019 soybeans, the current November 2019 soybean futures price is likely reflecting hope for a resolution to trade disruptions and large purchases from China.

Given the lack of updated USDA information, the potential balance sheets for the 2019-20 marketing-year remains somewhat of an academic exercise. However, the insight from this exercise is that the corn market can absorb additional area in 2019. The other takeaway is that soybeans need reduced area; however, strong market prices in the futures market may not motivate farmers to shed significant area. The local basis may provide the signal to farmers what to plant in 2019, as the soybean basis has been much wider than normal the last two harvests. Managers planning to sell corn or soybeans at harvest should monitor basis to gauge if basis contracts may be helpful in reducing basis risk at harvest.

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Nutrient Value of Feeding Hay

Each bale of hay contains mineral nutrients that come from soil reserves or from applied fertilizer. When fed to livestock, most of these nutrients will pass through the animals and can be recycled for future forage growth. As an example, a 5x5 mixed grass bale, weighing 1,000 pounds will contain around 18 pounds of nitrogen, 6 pounds of phosphorus and 26 pounds potassium (the exact amount will depend on the quality and species composition of the hay). At current fertilizer prices in early 2019 and assuming 75 percent of these nutrients are effectively recycled for plant growth, this would amount to around $14 in fertilizer value. If that hay sold for $35 per bale ($70 per ton), the fertilizer value would be 40 percent of the overall value of the hay.

How and where you feed this hay will make all the difference in the recovery of these nutrients. To be effective, nutrients need to be returned to areas on the farm that can effectively use them. If nutrients are lost before this occurs (leaching, volatilization, etc.), or if nutrients are spread on areas that are already high in these nutrients, much or most of the potential will be lost.

We don't always think about the overall process of feeding hay in terms of nutrients flow, but that is essentially what it is. You are exporting nutrients from your hayfields and importing nutrients wherever you are feeding the hay. If you are making your own hay, feeding it during the winter and spreading commercial fertilizer back onto the hayfields and pastures every spring, you have broken a nutrient cycle. If you are buying your hay and you still fertilize your pasture year-after-year, you have broken a nutrient cycle. This is one of the biggest avoidable costs on a livestock operation, and in my opinion, one of the lowest hanging fruits to improve profitability.

Nutrient Loss in Dry-Lot Conditions

Many cattle farmers will feed winter hay in dry-lots, stack-pads, and other engineered feeding structures with the belief they are capturing most of the nutrient value that came from the hay. Unfortunately, this belief is just not true. In a 1999 study on nutrient retention in feedlots, Biermann et al found that out of all the nitrogen that passed through the cattle, 57 to 67 percent was lost to volatilization, 5 to 19 percent was lost to surface runoff and 10 to 15 percent leached into the soil below the feeding area. Only 9 to 19 percent of the nitrogen was left in the manure by the time it was ready to be spread.

Dry-Lot Feeding
Hart County Kentucky

This was in commercial feedlots. Can we expect anything better from our on-farm drylots and other confined winterfeeding options? The answer is doubtful and to help understand why, we must dig into the details of dung and urine.

Roughly 33 percent of the nitrogen, 98 percent of the phosphorus and 10 percent of the potassium excreted by cattle is in the dung. Dung has a high organic matter content, and nutrients tied up with organic matter tend to be stable and not easily lost to the environment. Urine on the other hand is mostly water and has almost no organic matter. Roughly 67 percent of the nitrogen (almost all of the inorganic N which is readily plant available) and 90 percent of the potassium excreted by cattle is in the urine. Unless you have a high-carbon source (e.g. sawdust, straw, woodchips) that can tie up these nutrients, it will be almost

Bale-Grazing
Green County Kentucky

impossible to keep them from volatilizing, running off with surface water, or leaching into the soil when fed in a concentrated feeding area. In typical dry-lot conditions without this carbon source, most of the nutrients left after all the losses occur will be those found in the dung: most of the phosphorus, some of the nitrogen, and very little potassium.

Theoretically, around 33 percent of the nitrogen should be left in the dung, so why did the Biermann study find only 9 to 19 percent retention? The research on this question is not definitive, but a likely reason is that urease enzymes (found in urine) allow more stable forms of nitrogen to convert to ammonia, which is less stable. This process is accelerated by the mixing of urine and feces. Anyone that has walked through a "dry-lot" or other confinement facility can verify that a lot of this mixing goes on here. Animal scientists so far have been unable to train cattle to poop in one area of a confinement facility and pee in another area.

The more serious point being, even if you scrape every last bit of manure from the drylot and spread it back to the fields or pastures, you have lost a large portion of the nutrient value. The only way you could capture most of these nutrients would be if the manure was mixed with a high-carbon source and protected from the elements until it is ready to spread. This may be practical and cost effective with dairy cattle and some beef cattle backgrounding operations, but highly doubtful for a cow-calf operation even if the needed infrastructure is subsidized (i.e. cost-share).

Methods to Retain Hay-Feeding Nutrients

Potentially the most effective and efficient way to retain hay feeding nutrients is by bale grazing. Bale grazing is a winter-feeding technique where bales are set out on pasture before winter and fed in a planned, controlled manner, somewhat like rotational grazing.

Bale-Grazing Nutrient Dispersal
Taylor County Kentucky

It was highlighted in the December 2018 issue of Progressive Forages. If you search "Bale Grazing Progressive Forage" the article should show up at the top of your search, or you can go directly to the link at:
www.progressiveforage.com/forage-types/grasses-and-grazing/winter-bale-grazing
Very little research has compared retained nutrients from bale grazing with traditional hay feeding methods. The best and most comprehensive study was a Master's thesis by Paul Jungnitsch in 2008, and a subsequent journal article based on this thesis three years later. In this research, nutrient capture and subsequent forage growth with bale grazing was compared to conventional drylot feeding where manure was spread back onto pasture. Soil inorganic N (easily available to plants) was 187 percent higher in the bale grazed pastures. Extractable potassium was 185 percent higher in the bale grazed pastures. Phosphorus levels, however, were nearly identical in the bale grazed and dry-lot applied pastures (recall that almost all of the P is in the poop, which is

more stable). Subsequent forage growth over the next two years was 127 percent higher in the bale grazed pastures, and protein levels of this forage were 74 percent higher in the bale grazed pastures. Bale grazing was the clear winner over drylot feeding when it came to retained nutrients and subsequent forage growth. It wasn't even close.

I would point out that in most regions in the U.S. you probably do not want to feed at the high bale densities used in this Saskatchewan study. They likely fed all their winter hay on 5 to 10 percent of the pasture acres, while I typically recommend feeding on 33 to 75 percent of your pasture acres in the Upper South. At these lower densities, I would expect a much smaller forage production increase on a per acre basis. However, you will be getting that increase on more acres so the net production increase should be similar, if not greater. Think of this analogous to spreading 200 units of N/acre over 10 acres, or 40 units of N/acre over 50 acres: which would you expect to get a higher overall response to the nitrogen?

The Saskatchewan research assumed that the manure from the dry-lot would be spread back onto pastures. That may be a dubious assumption. I have been on few beef cattle farms in Kentucky and other nearby states that actually have a manure spreader, and can count on one hand the number of times I've seen a manure spreader in use on a cow-calf operation. That isn't to say manure isn't spread one these farms, but I know for a fact a lot of it, and possibly most of it isn't. I have seen all sorts of creative ways of getting rid of this manure, ranging from giant piles at the edge of the feeding area, to dumping it in hedgerows or the edge of a woods with a front-end loader. Even if a spreader is used, the manure doesn't always get spread where it needs to go. It often gets spread where it is easiest and most convenient.

Unrolling hay is another method that gives good nutrient distribution and is currently used with much greater frequency then bale grazing, at least in the eastern U.S. There are two things that I don't like about unrolling hay the traditional way: 1) You generally need to use a tractor every 1 to 2 days, and 2) You will inevitably be unrolling hay in conditions when you shouldn't have a tractor out on pasture, with the associated impacts. Those concerns aside, you can get great nutrient dispersion with this method. I would encourage farmers and researchers to experiment with alternative hay feeding systems that work similarly to bale grazing and hay unrolling.

Regardless of whether you are bale grazing, unrolling hay, or using another effective method to distribute nutrients, ultimately you will build up the nutrient levels of your pastures to the point where you are getting little benefit from continued hay feeding on them. At this point, and it may be years or decades before that point is reached on a particular farm, the only place left to feed hay to get the full benefits of the nutrients will be on the hay fields they came off. I realize that probably sounds like a radical idea to some, but I have seen it done well with good management. By learning to feed on your pastures first, you will develop the skill and management needed to take it to the next level when that time comes. Ultimately, both the bottom line on your schedule F and the environment will be better off for it.

If you would like help getting started with bale grazing or evaluating other options for improved nutrient cycling on your cattle farm, contact your county ANR agent and/or the author below.

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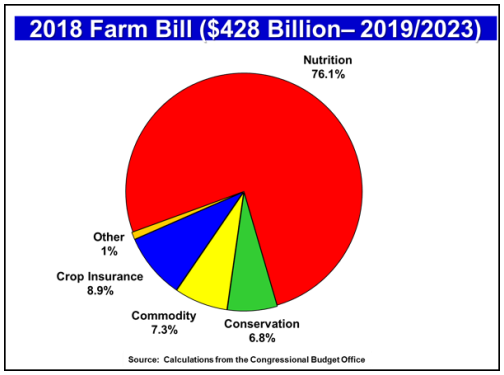
The Agriculture Improvement Act of 2018 (2018 Farm Bill)

The 2018 Farm Bill was passed by Congress and signed by the President last month. In reality, the structure of the 2018 Farm Bill is not much different than the previous farm bill (2014) with crop insurance, Agricultural Risk Coverage (ARC) and Price Loss Coverage (PLC) remaining the main safety net components for program crops. This status quo outcome was largely a result political realities and budget constraints. Once the controversial debate over the nutrition title was resolved, the 2018 farm bill passed by huge bipartisan support in both the U.S. House and the U.S. Senate. Given the current situation and outlook for the U.S. farm economy, the structure of this legislation provides safety net benefits, but will not



by itself relieve U.S./Kentucky agriculture from the current financial stress facing the sector.

Projected costs estimates reveal that nutrition programs will account for 76% of the funding for the life of the 2018 farm bill (2019-2023), compared to nearly 80% under the 2014 farm bill. Farm-related programs (commodity, conservation and crop insurance) comprise 23% of the total expenditures. The remaining one percent is split among other programs such as trade promotion, research/extension, horticulture, rural development, forestry, credit, energy and other miscellaneous programs.
The Congressional Budget Office indicates that the 2018 Farm Bill will be budget neutral over the ten year scoring period (2019-2028). Commodity support program funding is boosted primarily due to relatively low anticipated commodity prices and not due to major structural changes. Lower farm prices have led to lower premium subsidies for crop insurance outlays, which are also impacted by higher administrative fees for farmers selecting catastrophic coverage. Conservation, trade promotion, research and extension, and horticulture (primarily local and regional food and value-added programs) received higher funding over the 2019-2023 period. Increased funding for these programs were made available from changes in an escrow account held by the nation's rural electric cooperatives to pay off USDA loans as part of adjustments within the rural development title. Highlights from various components of the 2018 farm bill are summarized below.

Commodity Title:

- Marketing loan rates for program crops are increased, but at a level, which if observed, would be devastating to the current depressed farm economy. (See Table 1)

Table 1: Loan Rates and PLC Reference Prices

	Loan Rate: 2018 vs 2014 ($/bu)	Price Loss Coverage (PLC) Reference Price ($/bu) 1/	Maximum Effective PLC Reference Price ($/bu) 2/
Corn	$2.20 vs $1.95	$3.70	$4.26
Soybeans	$6.20 vs $5.00	$8.40	$9.66
Wheat	$3.38 vs $2.94	$5.50	$6.33

1/ Unchanged from 2014 farm bill
2/ 115% of the PLC Statutory Reference Price – see text below

- Producers will have the option to select between PLC or ARC for program crops on a crop-by- crop and farm-by-farm basis in 2019, and then again annually in 2021, 2022, and 2023. PLC remains the default option if producers do not make an election.

- PLC reference prices will initially remain at the levels established under the 2014 farm bill, with an escalator provision allowing these safety net prices to increase by a maximum of 15% above their statutory level. Specifically, the effective reference price is calculated as the greater of 85% of the five year Olympic moving average price (which excludes high and low prices during the five year period) and the PLC reference prices established in the 2014 Farm Bill. In reality, it will take a sustained period of commodity price increases during the life of the 2018 farm bill to elevate PLC reference prices above their 2014 levels. (See Table 1)

- For PLC calculations, producers will have an opportunity to update their yield history in 2020, based on their yield history during the 2013 to 2017 crop years. Program yield changes for each farm bill crop will be limited to 90% of the average farm yield per planted acre from 2013-2017, adjusted by national yield trends.

- Yield data collected by the Risk Management Agency (RMA) will become the primary source of data for ARC yield calculations, replacing National Agricultural Statistical Service (NASS) survey data. Separate yields will be used for irrigated versus non-irrigated land in each county in calculating ARC payment guarantees. In addition, the yield plug used for ARC calculations will be increased from the 2014 farm bill level of 70% to 80% of the county transitional yield.

- Both PLC and ARC program payments will be suspended for producers who did not plant a program crop on their base acres over the past ten years. Under this situation, producers would be eligible to enroll these acres into the Conservation Stewardship Program (CSP) for five years at an annual payment rate of $18/acre.

- Payment limitations (for ARC/PLC programs) remain at $125,000 per person or entity ($250,000 for married couples) for those individuals/entities whose Adjusted Gross Income (AGI) is less than $900,000. Payment eligibility is expanded to include cousins, nephews, and nieces who are deemed actively engaged in the farming operation.

- The major risk management tool for dairy farmers (protecting farmers when the margin between milk prices and feed costs falls below producer-selected coverage levels) was maintained, but the Dairy Margin Protection Program (MPP) was renamed the Dairy Margin Coverage (DMC) program. In addition, the DMC calls for greater premium adjustments and coverage level options (increased coverage from $8/cwt to $9.50/cwt for the first 5 million pounds of production) to provide an improved safety net for dairy farmers, especially smaller dairies. For specific details, check out www.fb.org/market-intel/reviewing-dairy-margin-coverage and https://farmdocdaily.illinois.edu/2018/12/dairy-provisions-in-the-2018-farm-bill.html

Conservation Title:

- Increases Conservation Reserve Program (CRP) acres from 24 million to 27 million over time. CRP rental rates would be capped at 85% of local rental rates for general signup acres and 90% for continuous signup acres.

- Increases funding for conservation programs by $555 million during the life of the 2018 farm bill with increased funding for the Environmental Quality Incentives Program (EQIP), but lower funding for the Conservation Stewardship Program (CSP).

- New incentives provided for producers who utilize cover crops, crop rotations, and other conservation practices that protect water quality.

Other Components

- Hemp is removed from the controlled substance list, allowing the crop to be eligible for federal crop insurance, and federal research grants.

- Increases annual farm loan authorization to $10 billion, up from $4 billion and boosts the limits on guaranteed loans to $1.75 million per borrower (vs current limit of $700,000), with incentives for socially disadvantaged and beginning farmers.

- Funding provided for broadband projects and programs to combat opioid addiction.

- Expanded research funding for organic research and extension programs, and specialty crop research.

- Maintains value-added producer grants, and funding for farmers markets, and local food promotion programs.

- Funding provided for beginning farmer programs.

- New funding for controlling animal disease breakouts.

The government shutdown has delayed USDA offering specific regulations related to the 2018 farm bill. So stay tuned for future developments as they evolve in the coming weeks/months. A copy of the entire 2018 Farm Bill can be accessed online at https://docs.house.gov/billsthisweek/20181210/CRPT-115hrpt1072.pdf.

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